We claim:

1/ A method comprising:

A) plasma treatment of a polymeric material,

B) plasma treatment of an adherend, and

C) thereafter contacting the polymeric material and the adherend;

thereby creating adhesion of the polymeric material and the adherend;

wherein the method is carried out during fabrication of an electronic device, an electronic device package, a photonic device, or an optoelectronic device.

2. The method of claim 1, wherein steps A) and B) are carried out concurrently.

3. The method of claim 1, wherein steps A) and B) are carried out sequentially in any order.

4. The method of claim 1, further comprising: storing the polymeric material after step A) and before step C), or storing the adherend after step B) and before step C), or both.

5. The method of claim 1, further comprising repeating steps A), B), and C) one or more times.

6. The method of claim 5, wherein steps A), B), and C) are repeated once to add a second adherend to the polymeric material.

7. The method of claim 1, wherein the polymeric material has a modulus of at least about 0.1 megaPascal.

8. The method of claim 1, wherein the polymeric material has a modulus of up to about 5 gigaPascals.

9. The method of claim 8, wherein the polymeric material has a modulus of up to about 1 gigaPascal.

10. The method of claim 9, wherein the polymeric material has a modulus of up to about 300 megaPascals.

11. The method of claim 1, wherein the polymeric material comprises a thermoset material comprising a flexibilized epoxy or an elastomer.

12. The method of claim 1, wherein the polymeric material comprises a thermoplastic material comprising a silicone-organic copolymer wax, a polyolefin, a polyimide, a phenolic, or combinations thereof.

13. The method of claim 1, wherein the polymeric material comprises a silicone, an organic, a silicone-organic copolymer, or combinations thereof.

14. The method of claim 13, wherein the silicone comprises a cured silicone resin, a cured silicone elastomer, a cured silicone rubber, or a combination thereof.

15. The method of claim 13, wherein the organic comprises a cured organic resin, a cured organic elastomer, a cured organic polymer, or a combination thereof.

16. The method of claim 1, wherein step A) and step B) are each independently carried out using a plasma treatment selected from corona discharge treatment, dielectric barrier discharge treatment, and glow discharge treatment.

17. The method of claim 16, wherein the glow discharge treatment is carried out using plasma selected from low pressure glow discharge or atmospheric pressure glow discharge.

18. The method of claim 1, wherein step A) and step B) are each independently carried out at a pressure of up to about atmospheric pressure.

19. The method of claim 1, wherein step A) and step B) are each independently carried out using a gas selected from air, ammonia, argon, carbon dioxide, carbon monoxide, helium, hydrogen, nitrogen, nitrous oxide, oxygen, ozone, water vapor, and combinations thereof.

20. The method of claim 1, wherein step A) and step B) are each independently carried out for a time of at least about 1 millisecond.

21. The method of claim 1, wherein step A) and step B) are each independently carried out for a time of up to about 30 minutes.

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~~23.~~ The method of claim 1, wherein step C) is carried out at a temperature of at least about 15 °C.

23

~~22.~~ The method of claim 1, wherein step C) is carried out at a temperature of up to about 400 °C.

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~~23.~~ The method of claim 1, wherein step C) is carried out for a time of at least about 0.1 second.

25

~~24.~~ The method of claim 1, wherein step C) is carried out for a time of up to about 12 hours.

26

~~25.~~ A method comprising:

A) plasma treatment of a polymeric material for up to about 30 seconds,

B) plasma treatment of an adherend for up to about 30 minutes, and

C) thereafter contacting the polymeric material and the adherend;

thereby creating adhesion of the polymeric material and the adherend.

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~~26.~~ A method comprising:

A) plasma treatment of a polymeric material;

B) plasma treatment of an adherend;

wherein steps A) and B) are carried out using a gas comprising air, argon, carbon dioxide, helium, nitrogen, nitrous oxide, ozone, or combinations thereof; and

C) thereafter contacting the polymeric material and the adherend;

thereby creating adhesion of the polymeric material and the adherend.

26 ~~27~~. A method comprising:

A) plasma treatment of a polymeric material;

B) storing the polymeric material for at least about 1 hour after step A),

C) plasma treatment of an adherend,

D) optionally storing the adherend for at least about 1 hour after step C), and

E) thereafter contacting the polymeric material and the adherend ;

thereby creating adhesion of the polymeric material and the adherend.

29 ~~28~~. A method comprising:

A) plasma treatment of a polymeric material;

B) plasma treatment of a substrate, wherein the substrate comprises a ceramic selected from aluminum nitride, aluminum oxide, silicon carbide, silicon oxynitride, and combinations thereof; and

C) thereafter contacting the polymeric material and the substrate;

thereby creating adhesion of the polymeric material and the substrate.

30 ~~29~~. A method comprising:

A) plasma treatment of a polymeric material;

B) plasma treatment of a substrate, wherein the substrate comprises a polymer selected from benzocyclobutene, bismaleimide, cyanate, epoxy, polybenzoxazole, polycarbonate, polyimide, polymethylmethacrylate, polyphenylene ether, polyvinylidene chloride, and combinations thereof; and

C) thereafter contacting the polymeric material and the substrate;

thereby creating adhesion of the polymeric material and the substrate.

31 ~~30.~~ A method comprising:

a) plasma treatment of a polymeric material,

b) plasma treatment of a substrate,

c) plasma treatment of a semiconductor,

d) contacting the polymeric material and the substrate, and

e) contacting the semiconductor and the polymeric material;

thereby creating adhesion of the substrate and the polymeric material, and the polymeric material and the semiconductor.

32 ~~31.~~ The method of claim 30, wherein steps a), b), c), d), and e) are carried out in an order selected from: abcde, acbde, abced, acbed, bacde, baced, bcade, bcaed, cabde, cabed, cbade, cbaed, abdce, badce, acebd, caebd, abdace, badace, abdcae, badcae, aceabd, caeabd, acebad, or caebad.

33 ~~32.~~ The method of claim 30, wherein steps a), b) and c) are carried out concurrently, and thereafter steps d) and e) are carried out in any order.

34 ~~33.~~ The method of claim 30, wherein steps a), b) and c) are carried out in any order, and thereafter steps d) and e) are carried out concurrently.

35 ~~34.~~ The method of claim 30, wherein steps a), b), and c) are carried out concurrently, and thereafter steps d) and e) are carried out concurrently.

36 ~~35.~~ A method comprising:

A) plasma treatment of a polymeric material,

B) plasma treatment of a first adherend,

C) plasma treatment of a second adherend,

D) contacting the polymeric material and the first adherend, and

E) contacting the polymeric material and the second adherend;

thereby creating adhesion of the polymeric material and the first adherend and thereby creating adhesion of the polymeric material and the second adherend.

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36. The method of claim 35, further comprising repeating steps A), B) and D) at least once.